REMARKS

By this Amendment, claims 4 and 5 are cancelled, and claims 3 and 16 are amended, thereby leaving claims 3 and 16 pending in the application. The amendments do not add new matter. Favorable consideration and allowance are respectfully requested in light of the following remarks.

Rejections Under 35 U.S.C. § 102

Claims 3, 5, and 16 stand rejected under 35 U.S.C. § 102(b) over U.S. Patent No. 5,902,093 to Liotta. Claim 5 has been cancelled. This rejection is respectfully traversed.

Claim 16 has been amended to recite the features of cancelled claim 4. As claim 4 is not rejected under this ground of rejection, the rejection of claims 3 and 16 is moot.

Rejections Under 35 U.S.C. § 103

Claims 3, 4 and 16 were rejected under 35 U.S.C. § 103(a) over U.S. Patent No. 5,052,889 to Abdel-Messeh in view of U.S. Patent No. 5,603,606 to Glezer et al. ("Glezer"). Claim 4 has been cancelled. This rejection is respectfully traversed.

Claim 16, as amended, recites a component of a fluid flow machine comprising a coolant passage comprising at least one curved flow section configured to curve in a first flow direction to establish coolant medium flow in the first flow direction; and a second passage comprising a dust discharge aperture having a longitudinal axis essentially parallel to an axis of the fluid flow machine, the dust discharge aperture arranged and dimensioned to enable the introduction of a

borescope through the dust discharge aperture and the second passage, and the second passage (i) branching off the coolant passage at the curved flow section and (ii) being arranged to extend in the first flow direction along a flow path which is tangential to the curved flow section. Support for the recitation of the "dust discharge aperture" is provided, for example, at paragraphs [0006] to [0009], [0013] and [0014] of the specification.

The exemplary component shown in FIG. 2 comprises a dust discharge aperture 5 extending essentially parallel to the machine axis. Dust particles, due to their inertia and the high flow speed of the deflected cooling medium in which the dust particles are entrained, move via the channel 7 leading to the dust discharge aperture 5, while the cooling medium is deflected at the branch in the direction toward the machine axis and conducted, relatively dust-free, past pins 6 to the cooling air apertures at the rear edge of the blade. The dust discharge aperture 5 has a sufficiently-large diameter to allow a borescope to be introduced into the interior of the turbine blade, i.e., into the hot gas path. Thus, in the illustrated embodiment, the dust discharge aperture 5 provides two functions in the component; namely, allowing dust to be removed from the cooling medium, and allowing inspection of the hot gas path in the interior of the component.

In the component recited in claim 16, the second passage comprises a dust discharge aperture arranged and dimensioned to enable the introduction of a borescope through the dust discharge aperture and the second passage. The second passage is sized to allow dust exhaust and inspection, but, as a dust discharge aperture, is **not** sized for the purpose of cooling *per se*.

As described at paragraph [0007] of the specification, a turbine blade including a dust discharge aperture ("dirt removal hole") is disclosed in U.S. Patent No. 4,820,122 to Hall et al. As shown in Figure 2 of Hall, a dirt removal hole 48 is positioned to discharge dirt entrained air. The dirt removal hole 48 is formed at the tip of passage 36, which substantially narrows in size along its length in the direction toward the dirt removal hole 48.

Applicants submit that one skilled in the art would know that a dust discharge passage is dimensioned to avoid a significant loss of cooling medium through the hole, and thus would not be dimensioned like a cooling channel.

In annotated Figure 5 of Abdel-Messeh shown at page 8 of the Office Action, it is indicated that Abdel-Messeh's turbine airfoil includes a "curved section A" configured to curve in a first flow direction to establish coolant medium flow in that direction, and a "second passage B" with an "unnumbered inspection aperture." *See* page 6, second paragraph, of the Office Action. The Office acknowledges that Abdel-Messeh does not disclose that the second passage B is arranged and dimensioned to enable the introduction of a borescope through the inspection aperture and the second passage. The Office also acknowledges that Abdel-Messeh's second passage B has "obstructions" inside. See page 6, third paragraph, of the Office Action.

However, the Office contends that Glezer discloses a cooled turbine blade 114 having a tip passage 170 (i.e., horizontal gallery 170) and an "inspection aperture" 178 (i.e., exit opening 178). The Office contends that it would have been obvious to modify Abdel-Messeh's "second passage" so that it is "unobstructed" and dimensioned to enable the introduction of a borescope through the "inspection

aperture" and "second passage" in light of Glezer. That is, the Office contends that it would have been obvious to remove the cooling pins from Abdel-Messeh's second passage B.

At page 4, first paragraph, of the Office Action, the Office contends that removing the cooling pins from the second passage B of Abdel-Messeh's turbine blade or airfoil 56 would not render it unsatisfactory for its intended purpose. The Office further contends that the pins are mainly provided for structural support of the turbine blade 56, but that the trip strips 38, 38' (i.e., ridges) are not removed and they provide increased heat transfer rates and cooling. The Office takes the position that omission of an element (i.e., the pins) and its function in Abdel-Messeh's turbine airfoil would have been obvious if the function of the element is not desired.

However, the combination of Abdel-Messeh and Glezer does not support this rejection. Firstly, Abdel-Messeh provides no disclosure that the pins shown in FIG. 5 are "mainly provided for structural support of the turbine blade 56," as alleged by the Office. It is well known in the art that such pins are cooling pins that are provided in turbine blades for cooling purposes. As shown FIG. 5 of Abdel-Messeh, "gas passage B" in which the cooling pins are located is sized to allow substantial cooling air flow through the passage, which is consistent with the provision of the cooling pins to cool the turbine airfoil. Abdel-Messeh's "second passage B" is for the exhaust of cooling air only. Removing the pins from the "gas passage B" would affect cooling and thus would affect the temperature of the turbine blade 56 at least in the region of the passage. Abdel-Messeh does not support the position that the cooling function of the pins is not desired in the turbine blade 56. Applicants submit that Abdel-Messeh would not have included the pins in the turbine blade shown in

FIG. 5 if the pins were not required to be able to achieve the intended purposes of this component.

Accordingly, Applicants submit that one skilled in the art would not have modified Abdel-Messeh's turbine blade by removing the cooling pins as proposed in the Office Action, because this modification would result in undercooling and consequent overheating of areas of the turbine blade 56. As such, the modified turbine blade 56 would be unsatisfactory for its intended purpose, because the cooling pins are needed to achieve this purpose. Because the modified turbine blade would be unsatisfactory for its intended purpose, the Office has not established a suggestion or motivation to make the proposed modification. *See* M.P.E.P. § 2143.01(I). Also, because the modified turbine blade would be unsuitable for its intended operation, the Office has not established why the proposed modification would have been desirable to one skilled in the art. However, the prior art must suggest the desirability of the claimed subject matter. *See* M.P.E.P. § 2143.01(I).

Secondly, assuming *arguendo*, that the pins located in Abdel-Messeh's "gas passage B" are, in fact, provided mainly for structural support of the turbine blade 56, as asserted by the Office, which is a position Abdel-Messeh does not support, then removing the pins from the passage would damage the turbine blade due to loss of this support. The Office has not explained why loss of this support would have been desirable. Otherwise, if the pins were not needed to provide this structural support to the turbine blade (or cooling), then Abdel-Messeh would not have included the pins in the structure.

Thirdly, Glezer's gallery 170 is also only a cooling passage. As such, neither Abdel-Messeh nor Glezer suggests that the air cooling passage should be sized to provide a dust discharge passage, much less a passage that also allows inspection of the hot gas passage. In the embodiment of the turbine airfoil shown in FIG. 5 of Abdel-Messeh, it also appears that the zig-zag ridges 38' would still be an obstacle to such inspection, even assuming that the pins were removed.

For at least the foregoing reasons, the applied references do not support the alleged *prima facie* obviousness. Thus, claim 16 is patentable.

Dependent claim 3 is also patentable for at least the same reasons as those for which claim 16 is patentable. Therefore, withdrawal of the rejection is respectfully requested.

Conclusion

For the foregoing reasons, allowance of the application is respectfully requested. If there are any questions concerning this response, to expedite prosecution, the Examiner is respectfully requested to contact the undersigned at the number given below.

Respectfully submitted,

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